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Semiannual Progress Report on Contract:Nonr,282(00),NR 121-035
Covered period: July 1, 1952-December 31, 1952

Title: Mechanism of Antigen-antibody Reaction

Scientific Progress: In continuation of our previous experiments on the interaction between liver homogenate of rabbits injected with ovalbumin on the one hand, and isotopically labeled anti-ovalbumin from the plasma of immunized rabbits on the other, we found that only a small portion of the antigen present in the liver homogenate is able to combine with the homologous antibody. One portion of the antigen is bound to insoluble substances; another portion is soluble but not reactive, probably due to combination with compounds which prevent reaction with the antibody. We also found that the liver homogenate of normal rabbits combines with added rabbit serum gamma-globulin or with antibody, but that the amount of antibody bound is always lower than in the antigen-containing homogenates. Specific and non-specific combination of liver homogenate with antibody occur very rapidly at low temperature, and are not increased by incubation at 37^{0}. This indicates that the non-specific process consists of adsorption of gamma-globulin to cellular constituents such as nucleic acids or lipids. Preliminary experiments on radioautography of the liver of animals injected with I-131 labeled protein did not yet give any definite results, but are being continued.

Direction of project: It is our present task to get more information on the state of the antigen in the cell; we intend to use enzymes (nucleases, lipase) in order to break up nucleic acids and lipids and to release the antigen from possible combination with such molecules, and to prevent nonspecific adsorption of antibody. We also try to prepare antibodies against purine or pyrimidine bases by coupling of such bases with protein carriers.

Published papers:

1. C. F. Crampton, H. H. Reller, F. Haurowitz: Persistence of C^{14}-anthranilazoovalbumin in injected rabbits (Proc. Soc. Exp. Biol. Med. 80, 448, (1952)
2. F. Haurowitz and C. F. Crampton: The role of the nucleus in protein synthesis (Exp. Cell Research Supplement vol. II, 45, 1952)
3. C. F. Crampton and F. Haurowitz: Deposition of small doses of injected antigen in rabbits (J. Immunol. 69, 457, 1952)
4. F. Haurowitz, The mechanism of the biological response (Biol, Review 27, 247, 1952)

Housekeeping details

The following persons worked as half-time assistants under the contract:

Mr. Leon Ellenbogen, Mr. Morris Zimmerman, Miss Martha Dicks, Mr. Donald Therriault, all being graduate students majoring in biochemistry.

Similar projects on immunochemical work were supported by the Atomic Energy Commission with $5920.00, by the U. S. Public Health Service with $3996.00; a related project on the surface of globular protein molecules and of antibodies is supported by the American Cancer Society with $5000.00.

Bloomington, Indiana
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This report is submitted in answer to your letter ONR:442: LAS:ovj Ser 31159 of Dec. 19, 1952.